

US-CL-CURRENT: 525/397, 525/422 , 525/425 , 525/430 , 525/432
525/537 , 525/905
525/906 , 525/928 , 525/930

US-PAT-NO: 4340697

DOCUMENT-IDENTIFIER: US 4340697 A

TITLE: Heat resistant molding resin composition

DATE-ISSUED: July 10, 1982

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE
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US-CL-CURRENT: 525/420, 525/397 , 525/423 , 525/425 , 525/430
525/432 , 525/537
525/906 , 525/928 , 525/930 , 525/933 , 525/935

ABSTRACT:

The present invention relates to a heat resistant molding resin composition comprising 99-99.9 by weight of an aromatic polyamideimide resin, and 0-0.1 by weight of a thermoplastic resin which comprises at least one member selected from the group consisting of a polyphenylene sulfide resin, a polyamide resin, a polysulfone resin, an aromatic polyester resin, a polyphenylene-ether resin and a phenoxy resin. The thermoplastic resin must have a melt viscosity at 150.degree. C. of not more than 1.times.10.sup.5 poise and a decomposition temperature of not lower than 350.degree. C. The aromatic polyamideimide resin is improved in melt viscosity characteristics by being blended with the thermoplastic resin. Therefore, a resin composition is obtained which is excellent in moldability characteristics. This composition may optionally comprise various kinds of fillers. Shaped articles, obtained by melt molding of the compositions in accordance with the present invention, are excellent in heat resistance, mechanical characteristics, electrical characteristics, sliding characteristics and solvent resistance characteristics.

and may be
utilized in many different ways.
4 Claims, 0 Drawing figures
Exemplary Claim Number: 1

BSFR:

Polyimide resins, represented by the trademarks "VESPEL SP" of DuPont in the United States and "POLYIMIDE 2080" of Upjohn in the United States, are very excellent in heat resistance, mechanical strength, chemical resistance and electrical characteristics, but they lack melt processability and cannot be melt molded. In order to improve this defect, it has been proposed that better melt moldability may be imparted to a polyimide, for example, "POLYIMIDE 2080" mentioned above, by blending it with 30 to 50% by weight of polyphenylene sulfide (U.S. Pat. No. 4,017,555). However, as the polyimide resin itself is deficient in melt processability, a relatively large amount of the polyphenylene sulfide resin is necessary in the blend for imparting an acceptable melt processability to the polyimide. Therefore, the thus obtained melt moldable composition exhibits poor mechanical properties in comparison with the inherent properties of the polyimide itself.

US-CL-CURRENT: 251/312,267/158 ,277/523 ,277/530 ,411'544

US-PAT-NO: 4538790

DOCUMENT-IDENTIFIER: US 4538790 A

TITLE: Valve stem packing assembly

DATE-ISSUED: September 2, 1985

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE
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COUNTRY			
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US-CL-CURRENT: 251/214,251/312 ,267/158 ,277/523 ,277/530
,411'544

ABSTRACT:

A valve body has a stem passage rotatably receiving a valve stem. A packing surrounds the stem in the passage and a packing nut threaded on the stem applies axial force to radially expand the packing into sealing engagement with the stem and passage wall. Controlled slippage components interposed between the packing and packing nut allow rotation of the stem and packing nut without any rotational sliding movement against an end face of the packing. A packing support ring engages the end face of the packing adjacent the packing nut and includes a chevron surface for radially expanding the packing. A gland engages the support ring and a pair of reversely positioned spring washers are interposed between the gland and packing nut. During rotation of the stem, packing nut and spring washers, the gland rotates against the packing support ring. The chevron surface of the support ring includes notches for gripping the packing to prevent relative sliding movement therebetween. A

handle is
attached to the stem by a handle nut, and a spring washer
interposed between
the handle and handle nut prevents loosening of the handle nut.
28 Claims, 5 Drawing figures
Exemplary Claim Number: 14
Number of Drawing Sheets: 1

ESPE:

The packing support rings are constructed of a polyimide plastic material, such as Vespel (a trademark of E. I. duPont de Nemours and Company for specialty polyimide plastics having high temperature resistance). Making the support rings of Vespel instead of metal allows them to be constructed with an extra close fit to the stem. If the Vespel rubs on the stem, it wears slightly and does no harm. Metal support rings would score the stem, damage the surface, and, in turn, damage the Grafoil wear surface. Hence, metal rings would require larger clearances and this is not desirable because close clearances are essential to prevent packing extrusion for maximum life.

ESPE:

Vespel also survives a fire. Even though Vespel is a synthetic and is carbonized by the heat, there is no size loss. Vespel also retains enough compressive strength to function during and after a fire. There are also other new polymers which do not melt, burn, or vaporize, and these may be used instead of Vespel.

ESPE:

A metal ring gland bears against the upper support ring, and turns with the stem and slides on the ring. Vespel has good wear resistance and low friction, so its flat upper face makes a good bearing for the gland. Using a metal ring would preclude this solution for a rotational interface and would require some other controlled bearing area. The gland also provides a rigid backing for the Vespel support ring. The clearances for the gland are slightly larger to

preclude metal rubbing, but still close enough to support the Vespel and prevent it from cracking at an unsupported edge.

ESPE:

The unique shape of the spring washers lock them to the flats of the valve stem, assuring that the spring washers always turn with the stem and prohibit sliding motion between the springs and handle. The outer edge of the lower spring bears on the gland. Since there is almost a line contact, the unit stress is very high as is the friction, effectively locking the spring and gland together. Thus, the gland turns with the spring washers and stem, and, in turn, must slide on the Vespel support ring. The packing nut bears on the outer edge of the upper spring washer to create a strong locking action and prevent the nut from loosening during cycling.

ESPE:

All of the foregoing discussion is based on the primary application of the new packing assembly in a firesafe valve, but applies equally well to a valve intended for normal service at elevated temperatures. This would be above the range for a Teflon packing but within the capability of Vespel and numerous other high performance polymers. In that case it may be desirable to replace the support rings and the metal thrust bearing with a suitable plastic. The principles and component functions would not be altered.

ESPE:

Finally, the same basic construction can be used to advantage in the normal valve with Teflon packing, but not firesafe. In that case, the packing support rings need not be chevron shaped, and could be constructed from a reinforced Teflon ring instead of Vespel. The metal thrust bearing may be replaced by some rigid plastic bearing material such as Vespel or a filled, reinforced Teflon. The spring washers compensate for the very high expansion rate of

Teflon and prevent overloading the less rigid bearing.

DEPR:

In the preferred form, all of the metal parts are of suitable stainless steel.

Packing 54 comprises a wire reinforced Grafoil, while support rings 50,52 are

constructed of Vespel which is fifteen percent (15%) graphite filled. However,

it will be recognized that many of the features of the present invention may be

used with packings and support rings or other materials and that some or all of

the metal parts may be replaced with appropriate different metals or plastic

materials. Such modifications and/or substitutions may be desirable to

accommodate different valve applications.

US-CL-CURRENT: 137/515.29,137/540 ,137/543.17 ,137/843 ,251/333
,251/334
,251/368 ,417/566 ,417/567

US-PAT-NO: 4368755

DOCUMENT-IDENTIFIER: US 4368755 A

TITLE: Valve assembly

DATE-ISSUED: January 18, 1983

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE
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N/A			

US-CL-CURRENT: 137/512.2,137/515.29 ,137/540 ,137/543.17 ,137/843
,251/333
,251/334 ,251/368 ,417/566 ,417/567

ABSTRACT:

There are disclosed herein several embodiments of a pressure responsive discharge valve assembly particularly adapted for use in reciprocating type gas compressors. The valve assembly includes a discharge passage valve seat of frusto conical shape in which a generally complementary shaped light-weight valve member is disposed. The valve member is preferably formed from a polymeric material, but may also be formed of metal. The materials used and the relative geometry of the valve seat and member are such as to reduce clearance or reexpansion volume, provide quiet closure with good sealing, long life and high speed operation, and still have the required flow areas at low valve lifts, thereby providing improved flow characteristics and efficiency. The included angles of the valve and seat are slightly different to provide progressive closing and sealing without permanent deformation. The valve concepts are also disclosed embodied in two other known types of valves in which the valve element is provided with a central opening and associated closure means to provide additional discharge flow area. The closure means in one embodiment is in the form of a fixed member and in another

embodiment is in the form of a second separately biased movable valve disc member.

The discharge valve of the present invention is also shown in combination with several different types of known suction valves.

36 Claims, 15 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 3

DEPP:

At the present time the preferred material for the valve member is "Vespel", a polyimide resin available from duPont Company, Wilmington, Delaware. The compositions identified as "SP-1" and "SP-21" have been found to give excellent results. The use of such a polymeric composition for discharge valve member 30 facilitates easy fabrication, such as by molding, and the relative light weight of the valve member facilitates high speed operation due to the reduced inertia of the valve and the ability to use lighter springs, as well as reducing noise generated by contact of the valve and valve seat. The "Vespel" material is ideally suited for such application as it is able to resist degradation from relatively high temperatures and is unaffected by either refrigerant gas or lubricant. It has been found that the maximum operating temperature to which the refrigerant and lubricating oil can be subjected without damage is less than that for "Vespel". "Vespel" is also compliant enough to seal without permanent deformation.

DEPR:

Other suitable polymeric materials having the noted characteristics which it is believed may also be used, include those commercially available under the trademarks "Vespel" KS (an aramid resin available from the duPont Company), "Sparmon" (a polyimide resin available from Sparta Mfg. Co., Dover, Ohio), "Valox" 420 or 420-SEO (a glass reinforced, thermoplastic polyester available from the General Electric Co., Pittsfield, Mass.), "Ryton" (a

polyphenylene
sulfide available from Phillips Petroleum Co., Bartlesville,
Okla.), and
"Torlon" (a poly (amide-imide) resin available from Amoco
Chemicals Corp.,
Chicago, Ill.).